IMPACT OF ARTIFICIAL INTELLIGENCE ON START-UP IN DELHI NCR

SHORT SYNOPSIS

Submitted in partial fulfilment of the requirement of the degree of

DOCTOR OF PHILOSOPHY

by

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DECLARATION BY THE SCHOLAR

I hereby declare that the short synopsis entitled "**Impact of Artificial Intelligence on Start-up in Delhi NCR"** being submitted in partial fulfilment of the requirement for the degree of Doctor of Philosophy in the **Department of Business** under the **School of Business** of Manav Rachna University, Faridabad during the academic year **2025-2026.**

It is the work that is expected to be carried out under the supervision of **Dr. Teena Hassija**.

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ABSTRACT

Artificial intelligence has played a very important role reshaping the reality that we have today, it has totally transformed the start-up ecosystem, it has accelerated the digital innovation taking place globally. Artificial intelligence is driven by innovation, data sets, scalability and it drives economies globally, for start-up it has significantly improved operational efficiency. AI has enhanced start-up and increased its productivity and efficiency by automating most of the work which makes it cost effective, it improves data driven decision making. Nations that want to work on growing and developing their countries strategically and increase their GDP growth have started to invest in AI along with the big companies who have realised its importance. There is limited Indian based empirical research on impact of Artificial intelligence on start-up. Although this revolution comes with its own challenges which includes data biases, lack of data quality, inadequate talent acquisition, limited qualitative insights, weak capability analysis, there is poor linkage between AI and performance. There is a lot of infrastructure and budget which the government needs to work on. It has under explored legal and ethical dimensions where customer data privacy is affected which puts many users at the challenge to rely on it. The global competitiveness of AI in start-ups is increasing day by day which needs to be looked upon immediately to keep up with the recent development around the globe.

The objective of this research is to assess AI adoption levels, to identify implementation challenges in artificial intelligence that startups are facing, examine the impact that it has on innovation and create an adoption framework for the people and government so that they work in that direction and grow further and propose policy recommendations for the same. The proposed research method will make use of a mixed- method approach to examine impact of artificial intelligence on start-ups in Delhi NCR through the usage of both qualitative and quantitative research paradigm. The quantitative study makes use of a

structured survey of about 500 start-ups in Delhi NCR. The quantitative method gathered experience using semi structured interviews.

Thematic and comparative analysis will be used. Bibliography data, study report types, geographical focus discussed, empowering the findings. Sample size will be calculated by yamen style; interview will be conducted by purposive sampling method. Quantitative analysis will be done by regression through SPSS and Excel. Qualitative analysis will be thematic analysis Anova and reliability will be calculated by Cronbach's alpha SPSS. Artificial intelligence has improved the productivity of start-ups with cost reduction. What would take a human and a day or two to do the same task now happens to be complete in minutes. The key finding of this research is that artificial intelligence improves innovation. Its capability determines success, the barrier with AI limits its scalability and gender gaps persist, the data quality seems to be a big challenge for companies. There is a gap of skill in people present in the market looking for roles because they haven't adopted and skilled themselves to work with AI yet.

There is a very huge gap in the policy support from the government on usage of AI for start-ups and skilling its people with it so that we can compete in the global market. Artificial intelligence skill development programs or schemes need to be run by the government to make more people equipped with it the fen of AI. This will not only develop us but also strengthen the start-up ecosystem even more. A gender inclusive intervention necessary in this area. There is a need for an ethical compliance framework, infrastructure needs to prioritize the same and long-term strategic integration is going to play a crucial role in the impact of AI on start-ups as well.

Key words: Artificial intelligence, Start-up, Delhi, AI adoption, AI innovation, productivity enhancement, Deep learning,

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Chapter 1: Introduction

1. Evolution of Artificial Intelligence:

Artificial intelligence is often used as an umbrella term to describe the types of technology that can stimulate human intelligence. It's the ability of a computer or a machine to think and learn. It's also considered as a field of study that tries to make computers "smart", where computers woke on their own without being encoded with commands. It is the study of how to make computers do those things that now humans do better. Artificial intelligence is a term introduced by a computer scientist Mc. Carthy in a workshop at Dartmouth in 1995. John McCarthy defined artificial intelligence as "The science and engineering of creating intelligent machines in which intelligence is the computational part of the ability to achieve goals in the world". Turning in 1950 defines artificial as "As a science and engineering of making machines intelligent machine, especially intelligent computer programme"

1.1 AI in Mid- Nineties:

Symbolic AI in 1956 was one the most well-known artificial intelligence in the mid-nineties is also called classical AI. The key concept of this AI was it used to run on symbols and logical reasoning for solutions. Although it had its own challenges which included that in symbolic AI one has to manually encode everything into the system unlike today where we let the AI encode on its own. Due Manually encoding it is difficult for the AI to understand the real world on its own. It lacked the ability of understanding the complexities of the real world and to learn from big data sets.

1.2 AI in Late Nineties:

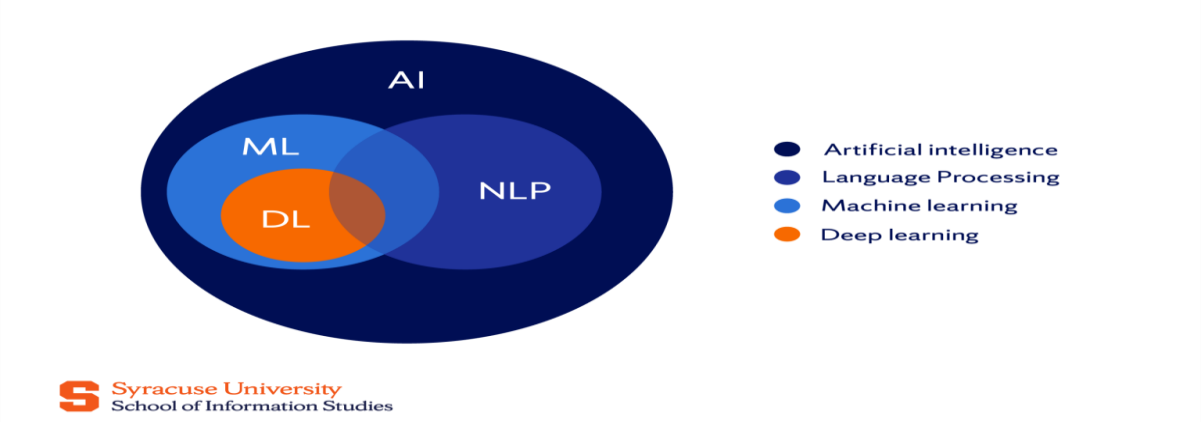
During the late nineteenth century neutral networks gained more importance. Neutral network was the one which reflected how Neural connections in the brain work, neutral network evaluates the data and accesses it multiple times to simplify complex features of the data. The neutral network is then capable of understanding the data and use the correct information for a new data e.g. Once it learns a particular process and how to operate it it can further do that process multiple times for various such data sets. Mc. Culloch and Walter Pitts were the first ones to discover a neutral network in 1943. Later, MIT researchers mathematically explained how a neutral network performs basic tasks. Advancements were noted in the neutral network when Schmid Huber updated the application after which it could be used for language

processing. Schmid Huber and his students after a few decades highlighted the power of deep learning, and neutral network application was further developed.

1.3 AI in Twentieth Century:

In the first few decades of building AI, researchers-built robots to enhance and advance technology. As a result, some robots were mobile, some were fixed and rested with arms. Robots had computer vision and the ability to understand its environment. These robots could move around blocks and were used under a very scripted and controlled environment to perform repeatedly. Robotics later impacted various areas but not until SLAM came simultaneous localization and mapping which contributed to self-driving, vacuums and drones etc. today it has advanced into behaviour-based robotics which works through human touch also called as haptic technology.

Fig1: Types of AI



Sources: https://ischool.syracuse.edu/wp-content/uploads/different-types-of-ai-1536x1024.png

2. Start-Up:

A business that has been newly established with the unique ideas and designed for fast and rapid growth in the market is a start-up. Initially start-ups may scale a small target through technology and run in uncertainty and risk unlike the traditional businesses. Paul Graham in 2012 defined start-ups as companies that are designed to grow faster. Wherein he quoted that being newly found does not affect a company a start-up nor does it necessarily have to work on technology to take up venture capital funding, existing and growing for it to be called a start-up. Start-up is also a temporary organization that is designed to search for a repeatable

and scalable business model is also called a start-up, says Steve Black. According to the government of India "A Start-up is an entity that has been registered less than 10 years ago with an annual turnover of anything below that 100 crore which holds high potential of employment and wealth creation works towards development, innovation and improvement of product service".

2.1 Evolution of Start-Up:

The beginning of the start-up ecosystem happens to take place in Silicon Valley with a combination of venture capital, technology and risk taking for rapid company growth. Now that startups ecosystem exists worldwide incubators, accelerators and crowd sourcing finding with investment funds leading innovation in the industry.

Indian startups have evolved over the years especially in the tech finance and consumer sector. Governments on the other hand have taken various initiatives like start-up India to promote entrepreneurial skills among young adults also welcoming foreign investors giving a chance to rising start-up in various sectors like SaaS, social impact, Fintech, Ed-tech etc.

3. AI in Start-Ups:

Global adoption of artificial intelligence continued to rise in the second half of 2025, increasing by 1.2 percentage points compared to the first half of the year, with roughly one in six people worldwide now using generative AI tools, remarkable progress for a technology that only recently entered mainstream use.

To track this trend, we measure AI diffusion as the share of people worldwide who have used a generative AI product during the reported period. This measure is derived from aggregated and anonymized Microsoft telemetry and then adjusted to reflect differences in OS and device-market share, internet penetration, and country population. Additional details on the methodology are available in our AI Diffusion technical paper.

No single metric is perfect, and this one is no exception. Through the Microsoft AI Economy Institute, we continue to refine how we measure AI diffusion globally, including how adoption varies across countries in ways that best advance priorities such as scientific discovery and productivity gains. For this report, we rely on the strongest cross-country measure available today, and we expect to complement it over time with additional indicators as they emerge and mature.

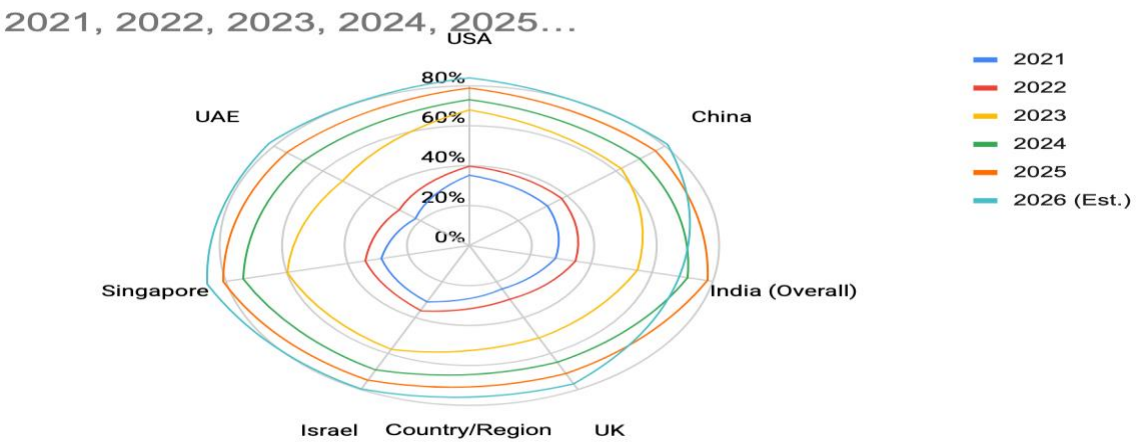
Artificial intelligence has made immense impact globally start-up since so many years have undergone several shifts but since AI entered the start-up ecosystem the development

accelerated drastically for example ChatGPT, Gemini these AI since they have boomed have been used by several users through habits which can be used maintain digital appearance of the companies personalised chatbots for customer satisfaction and also running adds. The shift in the market has reduced the cost of paying for the same role where in AI can do this in minutes reducing the time as well. AI technology has changed the simple tool attribution of the digital technologies used long back into a collaborator. AI brings innovation and specialized expertise which optimises the start-up decision. The beauty of each AI like ChatGPT, Dall-E, Copy AI, and mental health start-up is that they all tend to work along with each other as well as in extension. In the global start-up arena today since 2023 almost 50% of funding all new ventures capital went into AI companies. AI globally is the fuel to next generation's high growth companies, the reason being there are now countless AI driven unicorns globally.

Despite progress in AI adoption, the data shows a widening divide: adoption in the Global North grew nearly twice as fast as in the Global South. As a result, 24.7 percent of the working age population in the Global North is now using these tools, compared to only 14.1 percent in the Global South.

A Stanford global report 2022 shows that around 71% of companies globally use artificial intelligence tools for running their company. Microsoft AI report has shown how AI has become one of the fastest adopted technologies in the history with more than 1 billion users impacting the economies and start-ups worldwide. Countries have invested in digital infrastructure, AI skills. UAE becomes one of the 1st ranked countries on working pollution using AI according to a report. Artificial intelligence has seen a rise since 2025. More start-ups tend to trust it for improved efficiency, enhanced customer engagement, manage big data sets and for scalability. AI adoption in entrepreneurship or start-up ecosystems has totally changed how traditional business used to focus on maximising resources and optimizing workflow. AI has an unmatched capability to generate insights, automate complex processes and help real time decision making in start-ups globally.

Fig 2: AI adoption rate globally



Sources: Authors Created

3.1 Impact of AI in Start-Up in India:

The transformative revolution of ai has been noted globally as many start-ups, enterprise now adopt to change. India has invested towards this profound transformation by understanding its competitiveness, potential and socio-economic impact. AI has already made its way to people's daily life problems and its solutions. People have started using AI for its virtual assistance through ChatGPT, Gemini and many more AI models. Wherein Chatbot, Gemini and Claude promise to change the entire landscape of workspace in coming months and years. The rise behind technology is driven by investment from giant techs who recognize the amount of potential this AI model holds. The Indian government embraces the AI revolution and puts forward opportunities for start-ups to leverage and drive the accelerated adoption of AI across various sectors.

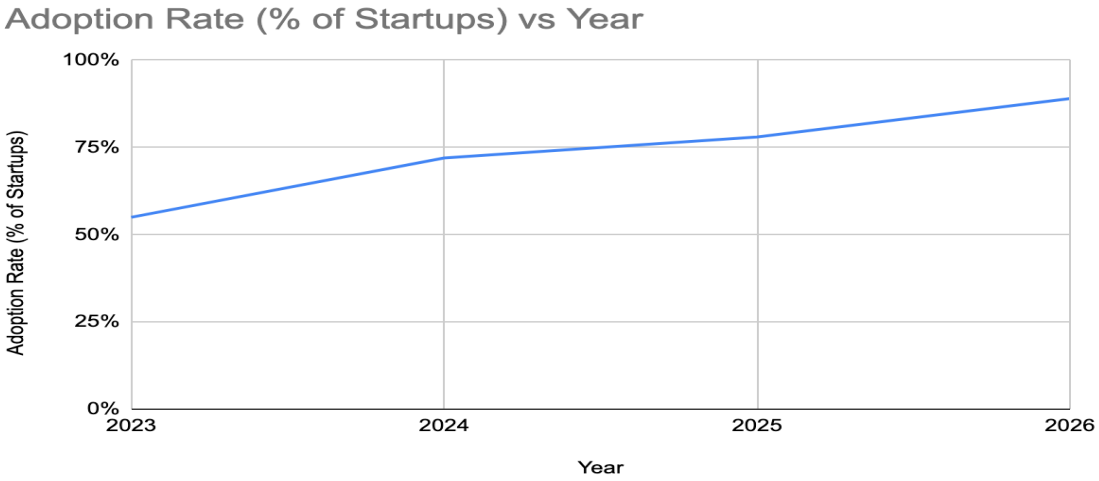
Impact of AI in India is spreading across various sectors like fintech, healthcare and retail sector. Recently India saw AI technological development to advance Indian languages AI in SARVANA and AI Bharata. India has increased investment in areas like tech and space because AIR has been able to tackle complex problems with simple solutions. India's goal is to reach 200 billion AI investments in the coming 2 years where an Indian AI start-up will build AI for the world.

India has surpassed its global counterparts in cloud platforms; AI first software SaaS many companies have demonstrated AI capability on scale implementation. Many surveys show that

Indian providers have around 66% of success rate. Whereas if we compare that from globally around who have reached 49%, India's percentage is higher. As corporate problem statements play a crucial part with showcasing agility and innovation many AI and SaaS providers are start-ups in India.

As Indian economies increase with time, AI has a very significant role in it. It is predicted that by 2035 AI will contribute an incremental value of around USC one billion to India's GDP, adding around 500 billion to India's GDP. As of February 2033, AI alone has generated around 45,00 jobs accumulating the growth of AI adoption in India. According to a NASSCOM report (2023) the demand for data science and AI professionals is estimated to reach one million. AI has had an immense positive impact on India's start-up and business as the employment generation statistics indicate. The state of AI report by Deloitte 2024 in India shows that India has expanded its investment and confidence in ai, many reports also depict that India's AI market will reach around 71 billion by 2027. Many start-ups and businesses are working towards bridging the technology gap so that they can compete with countries globally. Even though due to the 2023 slow and geo-political challenges many countries including India took a step-back in investment but by global economies and start-up growth through AI that has acceded the growth too.

Fig 3: AI Adoption Rate in India



Sources: Authors Created

Table 1: Evolution of Artificial Intelligence Adoption in Start-ups

Year	Adoption Rate (% of Startups)	Primary Focus / Key Tools	Impact on Business Operations
2021	~18%	Basic Automation: RPA (Robotic Process Automation) for data entry; simple rule-based chatbots.	Marginal gains in clerical speed; high implementation costs.
2022	~24%	Analytical AI: Early Machine Learning for recommendation engines (E-commerce) and basic lead scoring.	10–15% improvement in customer retention for early adopters.
2023	~55%	Generative AI (Text/Code): Large-scale use of LLMs (ChatGPT, Gemini) for emails, coding, and marketing copy.	Content turnaround time reduced by ~30%; democratization of "Expert" output.
2024	~72%	Predictive AI & Integrated CRM: AI-driven sales forecasting, real-time fraud detection, and multimodal bots.	Shift in VC Funding: "AI-native" became a prerequisite for seed-stage investment.
2025	~78%	Hyper-Personalization: AI for vernacular content (Regional languages), visual search, and predictive demand.	Tier-2/3 growth (+156%); deep penetration into non-metro markets.
2026	~89%	Agentic & Sovereign AI: Autonomous AI agents (Task-execution) and Small Language Models (SLMs) for data privacy.	Budget Transformation: 25% of marketing/ops budgets now fully automated by AI tools.

Sources: NASSCOM & Zinnov. (2026, February 25). *Indian Tech Startup Report 2025: AI at the centre of the next innovation cycle*. https://www.nasscom.in/knowledge-center https://www.pib.gov.in/PressReleasePage.aspx?PRID=2231706

Chapter 2: Review of Literature

2.1 Review of Literature:

The concept of artificial intelligence and its impact on start-ups have been widely discussed in academic literature and scholars have offered varied definitions based on opportunity identification, innovation and organizational development. Artificial intelligence is defined as the part of computer science concerned with designing an intelligent computer system, that is, a computer system that exhibits the characteristics we associate with intelligence in human behaviour- understanding language, learning, reasoning and solving problems. Steven Finlay in 2017 defines artificial intelligence as *"The replication of human analytics and decision making".* Ramtiyal et al (2025) did empirical research and emphasized that there are multiple challenges in adopting AI for start-ups and concluded in his studies that challenges around the implementation of artificial intelligence would occur at the economical, technological, institutional and environmental level. Bringing in a global perspective. Dwivedi (2022) in his studies found out that, the challenges associated with AI adoption are across 3 different levels technical: 1. lack of accuracy, biased results and explain ability 2. Lack of artificial intelligence-based skills. 3. People also tend to face ethical issues and regulatory concerns and legal challenges while adopting artificial intelligence. In 2024 Gupta found out that most of the challenges in adoption of artificial intelligence in India revolves around the ethical issues and the legal challenges in adoption of AI and using it for their customers and company as well. He stated an example of RBI and SEBI where they both are coming down to document drafting and documenting on how to regulate artificial intelligence. In research done by Ghosh and Rathi (2024) stated how it is a difficult task to integrate artificial intelligence in public

organizations and adoption of AI in the public sector. Sharma et al. 2025 conducted research on 300 people to find out how educators resist AI adoption and changes based on new technology. Sjödin et al., (2023) in their study specifically pointed out in their study that Startups are at the forefront of the enormous potential presented by the rapid expansion of artificial intelligence (AI), which allows them to innovate, scale, and disrupt existing markets. The adoption of artificial intelligence brings along a lot of transformation, but it also has long ethical and legal concerns. Due to these challenges are lack of transparency, algorithm biases and data privacy risks. Which leads to an increasing call for RAI (responsible artificial intelligence) & XAI (explainable artificial intelligence) that includes creating a space which practices artificial intelligence technologies for social cause and accountability. It has been noted that responsible artificial intelligence technology has gained its potential and competition over the years, mainly for start-ups which aim to sustain their businesses. Nahar & Omal (2024) in their study found out that artificial intelligence technology helps business owners in their business by customer service, boosting customer innovation, enhancing product and advancement in process, helping improve in their competitiveness market with digital readiness especially in sectors like fintech, ed tech, healthcare. Their research also shows artificial intelligence technology improves business innovation in multifaceted ways. According to their research artificial intelligence-based start-ups are likely to gain competitive advantages because of digital readiness and innovation capabilities. Gupta et. (2024) conducted a cross-sectional study amongst 279 company founders, managers and AI leaders. He used stratified sampling method to collect his data and ensured that multiple sectors were represented which included fintech manufacturing, retail and health care, Ed Tech. In this research he found out various impacts that artificial intelligence had across sectors. The research highlighted improved business performance advantages of AI on start-up. Ransbotham et al. (2018) note that early AI adopter's “Pioneers” are already applying natural language processing and computer-vision solutions, but most organisations, regardless of size, face hurdles in scaling these points solutions enterprise-wide, underscoring the need to

A second theme is the democratisation of advanced AI through cloud-based foundation models. API-delivered AI services now make adoption accessible and affordable to any organization, regardless of size by exposing off-the-shelf language- and vision-processing functions (Tsaih et al., 2023), while controlled experiments show that even individual freelance developers can boost productivity, especially in coding (Peng et al., 2023). However, there are barriers to entry. Firms often struggle to scale AI adoption due to limited investment and a lack of foundational enablers like data strategies and leadership commitment, with the most digitized firms investing

more and capturing more value (Bughin et al., 2018). Although up-front spending on AI infrastructure and the expense of hiring specialised talent can deter SMEs from launching AI projects, Zavodna, Überwimmer, and Frankus (2024) found that in their pilot study, these costs were rarely the primary obstacle; managers more often pointed to trust in AI outputs, limited internal know-how, and inadequate IT foundations as the dominant brakes on adoption. Integrating AI technologies

requires specific expertise that many start-ups do not possess internally (Sjödin, Parida, Kohtamäki, & Wincent, 2021), A lack of in-house expertise with AI frameworks and programming languages, together with the difficulty of integrating new applications into legacy IT often emerges as a major barrier for SMEs (Zavodna, 2024).

Rao, Tsay, et al., 2024 However, the recent advances in Gen AI, large-scale transformer models that create novel text, images, code, and other artefacts have further lowered the skill-and-cost threshold for AI use. State-of-the-art, pre-trained APIs such as OpenAI's ChatGPT and Meta's LLAMA (Touvron et al., 2024) now ship with low-code toolkits that allow non-experts to create and 17 customize models with minimal technical knowledge. Even though artificial intelligence technology comes with its evolutionary advantages, it also brings along challenges like data biases and many industries have noted biases on different levels as mentioned in table 2. Below, it has discussed all the biases that different industries have encountered over the years.

Table 2: Biases by AI in Different Areas

Bias Category	Specific Area of Bias	Statistical Evidence / Data Point	Impact on Women Entrepreneurs
Algorithmic Bias	**Credit Scoring**	AI models trained on historical data often undervalue non-traditional income (common in women-led SMEs).	**25% lower loan approval amounts for women compared to men with identical scores.**
Funding Bias	**VC Allocation**	Female-only founders received only 2.3% of total global VC funding in 2025.	All-male teams raise 3.7x more capital on average than female-only teams.

Adoption Bias	**Usage Gap**	Women adopt GenAI at a 25% lower rate than men (2025 data).	Risk of a "Digital Skill Gap" leading to lower operational productivity over time.
Training Data Bias	**Hiring & NLP**	Large Language Models (LLMs) still associate "CEO" and "Founder" with male pronouns 70% of the time.	AI-driven recruitment or networking tools may deprioritize female profiles in tech sectors.
Resource Bias	**Compute Access**	High GPU costs limit "Deep Tech" AI development to well-funded (mostly male) firms.	Women-led startups are concentrated in HealthTech & EdTech rather than high-computer sectors.
Socio-Cultural Bias	**Double Burden**	Women spend 3.5x more time on unpaid care work than men in India (2026).	Limits the time available for "AI Upskilling" compared to male peers.

Sources:https://www.deloitte.com/us/en/insights/focus/cognitive-technologies/state-of-ai-in-the-enterprise.html

2.2 AI Driven Efficiency in Start-ups

Singh et al. (2025) according to empirical research done by them, they interviewed around 30 start-ups owners and found out that AI benefits Indian business founders in managing and simplifying market data, opportunities which help improving product development, personalised user experience and streamline corporate process. David Bozward (2025) in their research emphasizes that artificial intelligence has helped anomaly detection, it figures out the missing data by predicting value when compiling data from multiple sources. It cleans the unstructured data which includes customer engagement through social media and emails. Khullar (2024) in his research concluded that human generally make mistake repetition of data of a particular customer name or in documentation artificial intelligence technology is trained enough to recognize those patterns and remove the, it has the ability to correct the errors, missing values and it's also has the ability of provide continuous observation and sport errors, unusual patterns in a fraction of second which sometimes get ignored by naked human eyes. Baker and Xiang, (2023) in their research found out that in their research there have been several working groups and draft papers that discuss approaches to various aspects of data

access and governance in India. Given the Indian context, there are several challenges which need addressing, so that access to data can be improved, Need for institutional oversight and regulatory clarity, to overcome the new and intricate challenges that may arise with regards to data access and sharing, institutional mechanisms are necessary. The appropriate governance and regulatory mechanisms would also have to be evolved so that ambiguities pertaining to ownership of data and data standards/ interoperability can be addressed. Need for streamlining data practices/ internal legacy challenges: Businesses usually collect data when they need it as part of their existing business operations. Cheng et al., (2021) in his research concluded that these legacy efforts and systems which are in place either depend on older practices or were designed for specific purposes. They are not optimized and, in some instances, curated in a way that existing datasets are AI ready. Companies may also be lacking the technical infrastructure and capacity to be able to develop and curate AI ready datasets. These gaps may especially be daunting for businesses that are relatively new to the prospect of developing and leveraging AI. Gianni et al., (2022; in his study stated that Higher stakes, liabilities and risks around data: The regulations around data creation, storage etc. are rapidly evolving especially for personal data and cross border data flows. It may be challenging for entities to keep abreast with such a rapidly evolving landscape, since it may require continuous adherence. Additionally, in the event of cyberattacks or data breaches, there may be liabilities and irreparable damages to the business which must be considered. These gaps continue to remain unaddressed. Luqman et al., 2024 in their research said that it is difficult for ai to work with multicultural and multilingual environment that India has it make it complex for it to work in data reason being that different area has different requirement and challenges the real ground results differ from that data to that is recorded by the AI.

2.3 AI Expertise and Skill Advancement:

According to Irman et al. (2025) in his research he stated that even though AI might replace some manual jobs, it will also create new opportunities in the field like data science, machine learning, AI engineering and cyber security. Putra et al. (2025) in his research found out that the demand for AI expertise will increase with time and companies which can manage the workforce transition to AI will have an advantage increasingly. Artificial intelligence seems to have many advantages specifically for start-up because AI has allowed them to manage large data sets accurately and create more efficiency. It improves AI based data analysis and enhanced decision making. Chatbots and recommendation engines help start-ups provide personalized customer experience, it takes away labour cost and responds to inquiries and requests quicker Deva et al. (2025). Laun et al. (2023) in his study found out that AI skills are

now in high demand and this demand will increase with time in various industries from health to finance. Companies now seek to leverage. AI will lead to enhanced job roles allowing job seekers to take up more complex and strategic tasks, while AI has grown efficiently to handle repetitive work which leads to change in skill requirement. Sundararajan (2022) in his findings show that data analysis uncovers valuable insight and suggestions for business, which also creates the need for professionals who can develop and apply artificial intelligence models to extract meaningful information from data. He also stated that AI can predict failure and optimize maintenance schedule accordingly. Paul et al (2024) in their research found out that machine learning, data engineering and more such Artificial intelligence technology la based skills will polarize the employment market, this will open new gates of employment for the youth and a new skill to add, learn and adopt with time. The hiring criteria will be focused on A specialised skills due the growing influences of artificial intelligence in the start-up ecosystem. Goldman sack in their report 2026 stated that artificial intelligence is about to take 300 million full time jobs and get replaced by new ones in the coming years thus startups, companies and individuals need to equip themes and their startups, companies with artificial intelligence and its advancement.

2.4 Budget and Infrastructure for Artificial Intelligence:

Moreover, recent studies portray AI as not a single artefact but an evolving organisational capability. Thus, AI is less like a discrete tool and more like an organisational capability that matures as firms accumulate data assets, technical expertise and governance routines (Mikalef & Gupta, 2021). Chaudhary et al. (2024) in their study stated that the government should grant or subsidise to promote the adoption of artificial intelligence in start-ups. Bhuiyan (2024) in his research found out that start-ups might look up to venture capitalist and angel investors for support in AI based business and its investments. Drawing on case studies of German manufacturing SMEs, Schuh et al. (2020) show that launching a handful of low-risk pilot projects produces quick, visible successes that nurture in-house “AI champions.” These newly trained experts then use their credibility to secure and steward subsequent AI investments even when budgets remain tight.

Given the significant budget and resource constraints faced by 59% of tech-enabled Start-ups’, coupled with the 57%that struggle with a lack of technical expertise, it is crucial to deploy government sponsored accelerator programs and promote cost effectiveness through adoption of open foundational models and distributed compute infrastructure, provides Technical Training, grants or subsidies for Start-ups’ to access technical training programs and workshops. These practices allow for experimentation and innovation without the pressure of immediate

high stakes. The necessity of these approaches is underscored by the sentiment analysis among tech-enabled Start- ups in continuation of NASSCOM's AI Adoption Index, which revealed that 100% of tech-enabled Start-ups' believe sandboxing and iterative development are essential for fostering confidence in AI adoption. Government aid Start-ups' require government help right from offering grants, subsidies, or tax incentives to funding opportunities for scaling AI. Offer flexible pricing models and financing options to make AI solutions affordable for Start-ups'. Provide access to government funding programs or venture capital for AI projects.

2.5 Legal aspects of Artificial Intelligence:

Navigating data privacy, security, and ethical use of AI is complex and essential for maintaining public trust (OECD, 2024). Regulations such as the General Data Protection Regulation (GDPR) impose strict requirements on data use, and non-compliance can result in heavy fines ((European Parliament & Council, 2016; European Data Protection Board, 2023). Shanmugan (2022) in his research stated that artificial intelligence can help in legal documentation because what minor mistakes are left from the human eye or repetition can be very carefully caught by AI thus AI could be used in legal aspects for documentation and mistakes correction. Battaglini et al. (2024) in their study found out that the data privacy and some primary challenges revolve around, major concern in managing company data sets and customer data. Against this backdrop, this thesis asks how Finnish start-ups bridge these capability gaps so that widely accessible Gen AI becomes an enduring, firm-specific resource rather than a transient productivity tool. Examining why and overcoming these barriers could be essential for start-ups to fully realise AI's benefits in business. On the contrary, ethical issues related to data privacy, public resistance to AI and algorithmic bias pose significant concerns. Biased datasets can lead to discriminatory outcomes in AI systems, particularly when models are not adequately evaluated across demographic groups (Mitchell et al., 2019). Wilson, Daugherty, and Morini-Bianzino (2017) further emphasize the need for human roles that ensure fairness and accountability in AI development. It is then crucial that start-ups navigate these ethical challenges to maintain trust and comply with regulations like the General Data Protection Regulation (GDPR). numerous benefits but also poses significant legal risks and ethical concerns. The application of AI systems is not only used in human resources, but in a wide range of other areas such as healthcare, finance, law and other sectors, leading to challenges in terms of data protection, discrimination, liability and transparency (Barton & Pöppelbuß, 2022).The use of AI algorithms can lead to unpredictable outcomes that raise legal liability issues. If decisions are made on the basis of AI-based predictions or analyses, liability

in the event of errors or biases in the algorithms could present a complex legal issue (Oletzky & Reinhardt,2022). In this context, there is a risk of violating data protection regulations if AI systems collect and process sensitive personal data without taking appropriate security safeguards. This could lead to non-compliance with data protection laws and potentially result in legal consequences (Vogel, 2022). Another significant risk is the potential for discrimination by AI algorithms. If they are trained on historical data that reflects pre-existing prejudices or inequalities, they could reinforce or reproduce these prejudices and thus lead to discriminatory decisions (Wachter, Mittelstadt et. al., 2021). The above-mentioned legal risks and ethical concerns related to the use of AI technologies are not limited to specific sectors but affect a wide range of applications and services. These challenges urgently require clear and comprehensive regulations to minimize the risks and ensure the responsible use of AI (van Giffen, Borth et. Al, 2020). To return to the context of recruitment and the labor market, the integration of AI in recruitment processes further exacerbates these challenges. The use of AI for candidate assessment and selection could lead to potentially discriminatory decisions that contradict legal requirements and ethical principles. These dangers emphasize the need for increased regulation, monitoring and further development of AI applications in recruitment to ensure that they are effective, fair, transparent and ethical (Carstensen & Ganz, 2023). Due to the ever-changing nature of AI, legal bodies are having issues in keeping up with integrating laws as efficiently hence leading to an increasing gap between legislations and AI ethical usage need to be optimized. AI-based platforms can efficiently match job seekers with temporary positions and thus contribute to a faster matching of supply and demand (Baethge et al., 2019). Studies confirm the continuous increase in online job searches and the use of platforms (Zils,2014; Statista, 2021). The main goal is to simplify the connection between job seekers and companies, especially for temporary work, as manual job searches and applications via multiple channels can be time-consuming. In Germany, despite the widespread use of smartphones for job searches, few apply directly via mobile devices, indicating untapped market demand. Statista (2020) shows that over 90% of job seekers prefer to search for vacancies on mobile devices (96.4% in other companies and 94.1% in IT companies), with over 88% intending to apply via mobile devices (91.1% in other companies and 88.2% in IT companies) (Statista, 2020). The development of mobile-first applications with AI integration could significantly increase efficiency. In addition to the challenges associated with the integration of artificial intelligence (AI) in recruitment processes, AI startups face specific challenges regarding their business models. The Business Model Canvas, a proven tool for visualizing business models, can also be applied to AI startups. However, it is important to note

that while the Business Model Canvas can serve as a tool for developing and analysing business models for various startups, applying it to A startups requires certain adaptations (Shevnina, 2022). The various segments that lead to business success for AI startups are primarily characterized by digital services, customers and the possibilities offered by the technology. The application of AI decisively shapes the business model of startups. Startups must therefore precisely consider the unique challenges of AI integration, including data management, model development and ethical considerations. This ensures a targeted analysis and development of successful business models in the context of AIR compared to conventional startups. However, the increasing integration of AI in various areas of our society brings 2016). AI integrated into the recruitment process can efficiently match candidate profiles with job offers, provide personalized recommendations, and speed up the hiring process.

Table 3: Legal Challenges Faced with AI

Legal Domain	Specific Challenge	Impact on Delhi NCR Startups
Data Privacy (DPDP Act 2026)	Consent-Based Training	Mandatory explicit consent for processing personal data to train AI models.
IT Rules (Feb 2026 Amendment)	3-Hour Takedown Mandate	Unlawful AI content (deep fakes/misinform) must be removed within 3 hours of a govt/court order.
Synthetic Content (SGI)	Mandatory Labelling	All AI-generated text, audio, and video must carry prominent labels and embedded metadata.
Intellectual Property (IPR)	Authorship Ambiguity	Indian law (Copyright Act 1957) still largely recognizes only "Human Authors."
Algorithmic Bias	Explainability & Audits	Regulators now demand "Explainable AI" (XAI) for high-risk sectors like FinTech and HealthTech.
Intermediary Liability	Loss of Safe Harbor	Failure to verify user-declared AI content leads to loss of immunity under Section 79.

Sources: https://www.pib.gov.in/PressReleasePage.aspx?PRID=2231706

2.6 Adoption of AI amongst Women Entrepreneurs:

Divekar & Mali (2025) in their paper reflected that to explore the levels of GenAI adoption, identify associated barriers, and provide recommendations for up-skilling initiatives and policy interventions to support women entrepreneurs in leveraging AI for business growth. Artificial intelligence in India has many benefits including enhancing decision making, enabling fast scaling and an improved access to networks. Even though artificial intelligence has limited adoption amongst women, those who have used AI in their business have noted a rapid growth and innovation benefits even though it has been noted that there is a very high level of interest amongst women business owners to AI in their business, actual adoption still remains restricted due to structural and cultural barriers. But whenever artificial intelligence technology has been adopted for upcycling business and improved decision making. Devis et al. (0205) suggested targeted Artificial intelligence skills should be included to address gender divide. Policies should be initiated to further facilitate AI in women- led business enhancing their overall business outcome. To conclude the exposure of AI has the potential to positively impact women's business strategy, performance and innovation.

2.7 Global Competitive and its Challenges:

Kalyanaraman (2025) in his study has found out that AI benefits Indian business owners by spotting market opportunities, improving product development, customizing user experiences, and streamlining corporate processes. According to his theory, these skills give businesses a competitive edge and sustainable growth in a market that is changing quickly. It demonstrated how AI may be used to find market possibilities and improve product development in certain areas. It highlights the difficulties and possibilities that emerging market entrepreneurs confront, which have an impact on their product strategy. The results offer governments, investors, and entrepreneurs' insightful information about how AI might help achieve competitive advantage and sustainable growth. They discovered through their study report that there isn't a thorough examination of how AI directly affects product strategy in the context of these areas' startups.

The goal of the paper is to shed light on the creative AI-driven strategies used by startups to improve product development, customize user experiences, and streamline corporate processes. The study concluded that AI is revolutionizing the way technology-enabled firms in Africa and India develop their product strategy. To examine the connections between entrepreneurial orientation (EO), global technology competency (GTC), product differentiation (PD), and product quality (PQ), Ramtiyal et al. (2025) used a thorough empirical investigation. The main analytical technique used to find significant correlations between the variables is structural equationmodelling.AI benefits Indian business owners by fostering innovation and risk-taking,

improving product quality and differentiation, and strengthening global technology competency. This makes foreign marketplaces more competitive, which eventually boosts the performance of entrepreneurs who are born globally. The approach places a strong emphasis on AI's function as mediator in the connection between technological innovation and successful entrepreneurship.

AI helps entrepreneurs in India by enhancing operational efficiency, driving growth, and improving customer experiences (Khullar et al., 2025). With over 77% of start-ups investing in AI and related technologies, it facilitates innovation and competitiveness in the rapidly evolving digital landscape. It highlights the significant role of AI in transforming industries and improving customer experiences in India. The authors project that the global AI market will grow substantially, reaching between USD 320 billion and USD 380 billion by2027, indicating a promising future for India's AI sector. The integration of AI and other advanced technologies signifies a period of digital disruption that Indian start-ups are actively navigating. The paper references a report that outlines the growth and potential of AI in India, indicating a review methodology to assess the current landscape. The paper concluded that over 77% of Indian start-ups are adopting advanced technologies, including AI, to enhance operational efficiency and drive growth (Srikanth, 2025). The research provides a data-based blueprint for policymakers and incubators to develop resilient, sustainable startup ecosystems. The paper employs a computational model that integrates artificial intelligence (AI) with the entrepreneurial ecosystem in the green technology sector. It utilizes to simulate various growth paths of green startups under different conditions using system dynamics, agent-based modelling, and machine learning. The research includes multi regional studies conducted in three green tech centres: Bangalore (India), Berlin (Germany), and San Jose (USA). The research methodology uses the data and metrics that are available publicly for start-ups and includes innovative indicators and indices for testing. The model has an inbuilt feedback loop which connects artificial intelligence analytics, ecological targets, inventors' behaviour that helps in enhancing the scalability and sustainability of start-ups. According to Weber et al. (2022); Zebhauser (2024) start-ups boost their performance and business model by embedding off-the-shore shelf, API based artificial intelligence technology and then feeding customer data back into them to get more refined output. This is an approach that stretches scares cash and talent which the AI capabilities mature. Lewicki et al., (2023) Research conducted on generic cloud AI which indicates how models can amplify hidden biases and risk vendor lock-in and help in highlighting a trade-off between long term development autonomy and rapid development for the organisation which lack strong data governance capabilities. According to

the research done by Agarwal et. al (2020) the integration of artificial intelligence in business has gained significant attention due to the transformation it brings., its strategic decision-making enhancement and improved business competitiveness. Goldfarb (2022) stated that artificial intelligence can act as a growth catalyst for start-ups by streamlining processes, cost cutting operations and enabling new forms of service and product innovation. Some of the key technologies that are leveraged include machine learning algorithms, natural language processing, AI powered automation and product analysis. These tools help companies automate routine tasks and analyse complex data (Brynjolfsson & McAfee, 2017), while also enabling intelligent trend forecasting that can surface growth opportunities and mitigate risks (Davenport & Ronanki, 2018). For example, Zest AI, a fintech company, utilizes strictly machine learning to improve credit underwriting processes and fraud detection, allowing for more accurate risk assessments and expanding access to credit (Zest AI, 2024). An operational solution that start-ups working in a specific field might consider acquiring to improve efficiency and precision.

2.8 Artificial Intelligence Leading Small Enterprises:

The "democratization" lets young firms reallocate their scarce talent toward higher order problem-solving (Ransbotham et al., 2018). Early evidence links AI capability bundles—comprising data, infrastructure, and human expertise—to higher organisational creativity and, in some cases, improved financial performance (Mikalef & Gupta, 2021; Ritala et al., 2024). Putra et al in 2025 in his studies stated that after adopting Artificial intelligence start-ups have noted up to 20% of efficiency in their work. Customer operation costs have rescued up to 30% and an overall increase in customer satisfaction of 18%. Irman et al (2025) in his research found out that artificial intelligence is beneficial in many ways for start-ups as it reduces labour cost, increases the speed of response to customer, provides personalized customer service, improves decision accuracy and improves operational efficiency. According to Loureiro (2020) artificial intelligence is transforming business and enhancing culture and economy by changing connections, stakeholder and public perspective offering competition and significant value addition. Yet accessibility does not guarantee seamless integration. Soni in 2020 in her research stated that start-ups have a strong ability to evolve and with help of artificial intelligence it will evolve the startup ecosystem and enable benefits from increased speed, scalability, consistency and cost saving. Vijay and Wisteri (2020) in their research stated that studies on start-up and artificial intelligence are limited but the environment seems promising. Empirical work continues to highlight persistent capability gaps in SME AI adoption. Integrating AI into customer-facing or internal applications requires architectural and

infrastructural expertise that many firms currently lack, due to outdated systems and limited internal support (Zavodna, Überwimmer, & Frankus, 2024; Weber et al., 2022). Meanwhile, staff upskilling and AI system monitoring often compete with short-term revenue pressures, delaying adoption momentum (Mikalef & Gupta, 2021; Zebhauser, 2024). Employees already managing multiple tasks report difficulty keeping pace with AI learning curves and system updates, slowing iterative improvement (Zavodna et al., 2024). Consequently, without complementary investments in data quality, infrastructure, and learning routines, off-the-shelf models rarely translate into a durable advantage, echoing Barney and Reeves' (2024) warning that generic AI alone is insufficient for sustained competitive advantage. Thus, AI may not always be VRIN. In addition, recent studies have highlighted the importance of developing organizational AI capabilities to leverage AI's benefits fully.

2.9 Artificial Intelligence in Institutions:

Mikalef and Gupta (2021) emphasized that AI capabilities encompass technical proficiency and the ability to align AI strategies with organizational learning and creativity, which drives firm performance. Ritala et al. (2024) argue that building industrial AI capabilities requires a learning perspective that integrates AI tools with organizational processes, enabling firms to adapt and innovate continuously. Similarly, while AI is becoming more accessible, achieving real business impact depends on embedding AI into core processes through systematic experimentation and feedback loops (Ransbotham et al., 2018). AI affects workplace outcomes through multiple methods, including changes in job design, employee engagement, and decision-making dynamics (Pereira et al., 2023). Nevertheless, while AI can be a powerful tool, it does not inherently create sustainable competitive advantage unless organizations effectively build and protect complementary resources and capabilities (Barney & Reeves, 2024). Finally, Sjödin et al. (2021) demonstrate that firms that develop co-evolutionary processes with AI—weare18 technology and organizational structures evolve together are more likely to achieve scalable business model innovation. These insights underscore the need for start-ups to focus on developing AI capabilities as an integral part of their newfound growth strategies. Thus, there is a scarcity of expertise in DC and AI. Start-ups may lack personnel with the necessary skills to develop or manage AI systems (CIO, 2025; OECD, 2025).

2.10 Research Gap:

The research addresses the AI drives the start-up ecosystem and innovation, although there is still a gap in the adoption for improving the compactness of India globally. The industry lacks people who are skilled with artificial intelligence expertise and technical skills. It has recently been discovered that artificial intelligence holds a high implementation cost which enables

start-up and small business owners to use it due to insufficient financial support and infrastructure. Even adoption of artificial intelligence comes with its own challenges like legal challenges, ethical barriers and compromised data quality, biased results which makes it difficult for any company to rely on it. It lacks data governance for public institutions; these kinds of regulatory incentives affect the confidence people have in it. People, institutions resist technological change which needs to be addressed. The daily usage of artificial intelligence technology increases cyber society vulnerabilities which leads to a trust deficit in usage of AI.

2.11 Rationale of the Study:

Artificial intelligence and its impact on start-up can be seen globally and its immense rise can be seen in India too. Artificial intelligence has an impact on every part of the business for many it has changed how business used to run long back. Even though artificial intelligence technology has made a positive impact and evolution of the start-up ecosystem it brings along with it many challenges too. The world seems eager to inculcate Artificial intelligence technology in their business but due to the skill gap adoption of AI seems like a big challenge. The industry lacks AI skilled workforce with right knowledge about it and its usage. It has been noted especially amongst the small business enterprise a lack of financial, infrastructure and talent acquisition to work for Artificial Intelligence in start-up. It has been noted that AI gives biased results and sometimes lacks data quality which creates a huge challenge for startups to completely rely on them. There are also legal obstacles in the way because data protection is a big challenge for companies who seem to rely on AI which does not have many laws in India right now. There is a digital divide in the tier 1,2 cities which create a problem for them to even use or understand AI in their daily tasks or work. Women face structural and cultural barriers which make it difficult for them to adopt AI. The government lacks effective awareness on accumulating AI use in start-ups. The global market is very competitive and dynamic and needs to work on its gap to be able to compete and use AI not just as a tool. AI implementation seems to affect fintech, health, manufacturing, and Edtech. Thus, Indians need sector specific insights to work on the implementation of AI in each sector. Understanding the biases can help policy makers target AI support for start-ups.

Chapter 3: Research Methodology

3.1 Research Design: Mixed Research Method

The proposed research method will make use of a mixed- method approach to examine impact of artificial intelligence on start-ups in Delhi NCR through the usage of both qualitative and quantitative research paradigm. The quantitative study makes use of a structured survey of about 500 start-ups in Delhi NCR. The quantitative method gathered experience using semi structured interviews. Thematic and comparative analysis will be used. Bibliography data, study report types, geographical focus discussed, empowering the findings. Sample size will be calculated by yamen style; interview will be conducted by purposive sampling method. Quantitative analysis will be done by regression through SPSS and Excel. Qualitative analysis will be thematic analysis Anova and reliability will be calculated by Cronbach's alpha SPSS.

3.2 Research Objectives

1. To Identify to what extent artificial intelligence is being adopted and its application across various industries.
2. To evaluate the impact such as performance, scalability and sustainability of Artificial intelligence on start-up.

3. To identify the challenges and barriers faced by start-ups in Delhi NCR while adopting artificial intelligence.
4. To explore artificial intelligence adoption policy recommendation and recommend strategies for adoption of AI in start- ups.

3.3 Hypotheses

H1: Artificial intelligence is widely adopted across many industries with various functional implementations.

H2: AI has positively impacted on start-up, scalability, performance, growth and sustainability.

H3: Startups in Delhi NCR face significant challenges and barriers while adopting Artificial intelligence.

H4: Boots policy interventions and strategic framework in adopting Artificial Intelligence for start-ups in Delhi NCR.

3.4 Population:

Population size opted; 500 people will be interviewed under the same for a statistically robust. A structured questionnaire will be used for collection of data based on a five-point Likert scale. Reliability of the instrument will be tested using Cronbach h alpha and construct validity will be taken through KMO statistics along with factor analysis. Average treatment effect will be conducted by ATE= E(Y1-Y0) the impact of policy will be estimated by multiple linear regression Where: $Y=\beta 0 +\beta 1\ X1 +\beta 2\ X2 +\beta 3\ X3 +\varepsilon$

Y = Start-up Performance

X_1 = AI Investment

X_2 = AI Automation Level

X_3 = AI Analytics Usage

ε = Error term

Table 4: Top States using AI in Start-ups

Rank	State / Union Territory	Approx. Recognized Startups	Primary Strengths / Sectors
1	Maharashtra	28,500+	FinTech, E-commerce, Logistics, Media

2	Delhi (NCT)	18,360+	EdTech, Consumer Services, Agri-Tech
3	Karnataka	18,200+	IT Services, SaaS, Deep Tech, Aerospace
4	Uttar Pradesh	16,500+	IT Consulting, Hardware, Green Energy
5	Tamil Nadu	12,100+	SaaS, EV Manufacturing, HealthTech

Sources: https://www.pib.gov.in/PressReleasePage.aspx?PRID=2231706

The table above discusses that Delhi NCR was opted for primary data collection and that is because Delhi turns out to be the top 2nd state in all over top 5 state which have adopted artificial intelligence in their start-ups.

Table5: Total Startups in Delhi

Metric	Current Value	National Context
Total DPIIT Recognized Startups	**~18,300+**	Delhi ranks 2nd in India, following Bengaluru.
Active Unicorns	**14 - 17**	Includes major players like Zomato, Paytm, and Lenskart.
Ecosystem Ranking	**#2 in India**	Ranks #11 globally in terms of ecosystem strength.

Sources: https://www.pib.gov.in/PressReleasePage.aspx?PRID=2231706

The table above shows how many start-ups are registered in Delhi and this number was collected to understand and take out a number of how many start-ups will be needed to collect the primary data from that are based in table 5.

3.5 Sampling Method:

In the sampling method we have first figured out how Delhi turns out to be the 2nd top state to research for start-up according to the start-ups it owns as per show in the table no4. Delhi has

been divided in geographical strata (North, South, East, and West Delhi, as well as the satellite cities of Noida and Gurgaon) to account for regional economic variations. A purposive sampling technique is then employed for each strata to sample respondents who meet a set of eligibility criteria: they must be a start-up owner, by employing the Yamane (1967) Formula, which is most appropriate for research in which the size of the population is known or can be estimated, the sample was determined to ensure a confidence level of 95%. The primary areas of interest for data collection include large industrial and business centres such as Okhla, Gurgaon, Noida, Bawana, and Janakpuri. These areas have been selected because they own most of the start-ups. By specifically targeting these regions, the research can capture a wide range of businesses and socioeconomic classes. In addition, the bibliographic information and research reports are used to validate the geographical focus, ensuring that the chosen participants are a fair representation of the entrepreneurial community in the national capital region.

3.5.1 Calculation of Sample Size:

According to the total number 18360 start-ups are currently working in Delhi and out of which we need to interview several start-ups as calculated below:

The sample size is determined using the formula:

Below 'n' represents the total population which is 183601 and e is the margin of error which is 5% (0.05), and substituting the value gives an average of 391. To ensure better reliability and account of potential non-responses or any incomplete data, we will round about and take an approximate of 500 to collect the data.

The sample size is determined using the formula:

*n=N1+N(e2) n = \frac{N}{1 + N(e^2)}*n=1+N(e2)N

Where N = 183601 and e = 0.05. Substituting the values:

*N=1836011+183601(0.0025) ≈399n = \frac{183601}{1 + 183601(0.0025)} \approx 399*n=1+183601(0.0025)183601 ≈399

3.6 Data Collection:

The study will be conducted with the help of a well-structured questionnaire for the collection of primary data. For questionnaire multiple choice and Likert scale questions will be prepared to study the impact. Whereas secondary data will be collected from journals, articles, government websites, research papers, magazines and websites.

3.6.1 Primary Data:

In the research primary data will be collected from interviews, surveys and observations. A questionnaire will be prepared, and it will be divided into various parts and to prepare the questionnaire ‘five-point Linkert' method will be used. Delhi NCR was opted for primary data collection and that is because Delhi turns out to be the top 2nd state in all over top 5 state which have adopted artificial intelligence in their start-ups as shown in Table No. 4.

Cronbach's Alpha formula will be used to calculate the reliability in their research, which measures internal consistency of some and how closely they are related to each other. This way will help us evaluate whether multiple questions are going to measure the same concept and produce consistent results.

Reliability will be assessed using **Cronbach’s Alpha**:

$\alpha = \frac{k}{k-1}\left(1 - \frac{\sum \sigma_i^2}{\sigma_t^2}\right)$ α=k−1k (1−σt2 ∑σi2)

Where:

- kk = number of items
- σ_i^2σi2 = variance of individual items
- σ_t^2σt2 = total variance of the scale

The formula shows k is representing the number of items in the scale i^2 referred to the variance of each individual item i^2 is the total variance of the overall scale. The higher value of the Cronbach indicates greater internal consistency among the item, wherein a threshold of 0.70 or above is considered acceptable suggesting that the scale is reliable.

So, to ensure that the instrument is reliable and valid, the construct validity will be accessed using several statistical methods. Hence the first KMO test will be conducted to measure sampling adequacy, indicating whether the data is suitable for factor analysis. A KMO value is greater than 60. 0 is generally considered acceptable.

A threshold of $\alpha \geq 0.70$ will be considered acceptable.

Construct validity will be examined using:

- **Kaiser-Meyer-Olkin (KMO) test** (acceptable if > 0.60)
- **Bartlett’s Test of Sphericity**

After this, EFA Exploratory Factor Analysis will be used to identify the underlying factors structure of the data without imposing a preconceived structure for the same. Thai will help in better understanding of how different items group together and if they align with expected

construct. Where an acceptable confirmatory factor analysis will be after that employed to test and validate their factors structure by accessing how well the observed data first hypothesised the model. This step ensures that the measured instrument is both consistent and accurately captures the intended constructs.

- **Exploratory Factor Analysis (EFA)**
- Confirmatory Factor Analysis (CFA), where appropriate

3.6.2 Secondary Data:

In the research various sources will be used for secondary data collection methods which include various academic journals, government websites, industry publications, business magazines, various reports of relevant organizations, reliable websites, articles which discuss start-up, artificial intelligence and innovation.

3.7 Data Analysis:

In this research data analysis will be conducted by using both qualitative and quantitative techniques.

Quantitative Data: In this research, quantitative data analysis will be conducted by using descriptive statistics to summarize the data, while the relationship between artificial intelligence adoption (independent variable) and startup performance (dependent variable) will be examined by regression analysis. Anova will be applied to compare differences across industries if needed and all the statistical analysis will be done by SPSS and Excel.

Qualitative Data: Will be analysed through thematic analysis to complete quantitative findings and provide a better insight into the barriers and challenges.

Table No 6: Research Design:

Step	Component	Method	Tools
1	Research Design	Convergent Mixed-Methods	Quant + Qual
2	Population	18,360 Start-ups	DPIIT Data
3	Sample Size	500 Start-ups	Yamane (1967)
4	Interviews	40–50 Founders	Purposive Sampling

5	Quantitative Analysis	Descriptive, Regression, ANOVA	SPSS / Excel
6	Qualitative Analysis	Thematic Analysis	Anova
7	Reliability	Cronbach's Alpha	SPSS

Source: Author created

Chapter 4: Expected Findings

The expected findings of the research 'Impact of Artificial Intelligence on Start-up in Delhi NCR should revolve around the study objectives of accessing the adoption level of artificial intelligence in start-ups, evaluating its performance, identifying its barriers and proposing policy recommendations.

To start with, the research is expected to find out how AI adoption among start-ups in Delhi NCR is on moderate to high level mostly in FinTech, EdTech, HealthTech, SaaS (Software-as-a-service) based enterprises. The artificial intelligence industry is also boosting with and becoming accessible to more people and to industries including AI tools, genetic artificial intelligence, machine learning, cloud-based service. Start-ups gradually tend to integrate artificial intelligence technology as a core part of their operation. Even though the adoption rate varies on factors like firm size, funding, availability and technical expertise.

Furthermore, this research is also expected to have a positive connection between AI adoption and its decision-making ability. AI driven analytics and its predictive model is likely to enhance start-ups data driven decision making, reduce uncertainty and identify market opportunities. Which is expected to contribute to improve its performance and digital readiness.

Moreover, innovation is another aspect of artificial intelligence technology which will have significant impact. Start-ups that integrate artificial intelligence technology into their operations are extracted to have a high level of product and service innovation. They enable personalized experience through chatbots, advance product development and create business models which will help contribute to innovation.

Cost effectiveness is another important part of the benefits from artificial intelligence technology adoption, because it can automate daily tasks, reduce dependency, manual labour

which will help start-up significantly lower operation cost. This plays a very important role in the early stage of an enterprise which has limited financial resources. AI driven tools can be used for marketing, customer engagement, and analytics of expected cost effectiveness alternatives from traditional methods that will lead to improved financial sustainability.

Lastly, artificial intelligence adoption is expected to boost the availability of the business by enabling effective handling of excessive workload with resources expansion and support rapid growth along with sustainable growth. Even though many barriers are likely to emerge with it which includes lack of Artificial Intelligence expertise which limits its effective implementation, poor data quality, standardisation and limited access which will affect its adoption. The gap in government policy funding, support and infrastructure can restrict its increasing adoption. The study is expected to highlight that the Artificial intelligence technology ecosystem can drive its success with AI positively influencing business growth and ultimately come up with a practical artificial intelligence adoption framework for start-up and policy makers.

Conclusion

In summary, the anticipated results from the current investigation demonstrate the opportunities and risks involved in integrating AI within the start-up environment. Although there are various benefits of implementing such technology, it is imperative that all challenges are addressed to ensure that its potential can be maximized. The contributions of the current investigation to the body of knowledge and practical implications are presented below.

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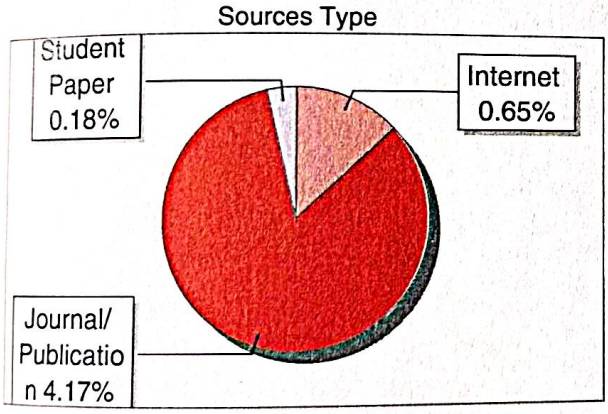

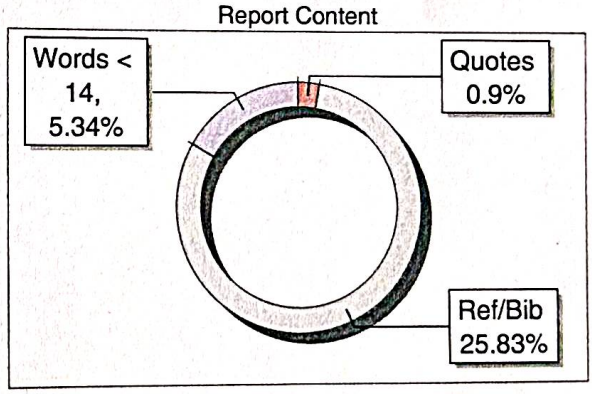

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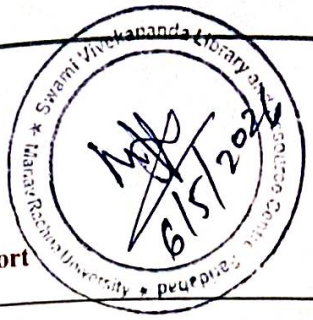

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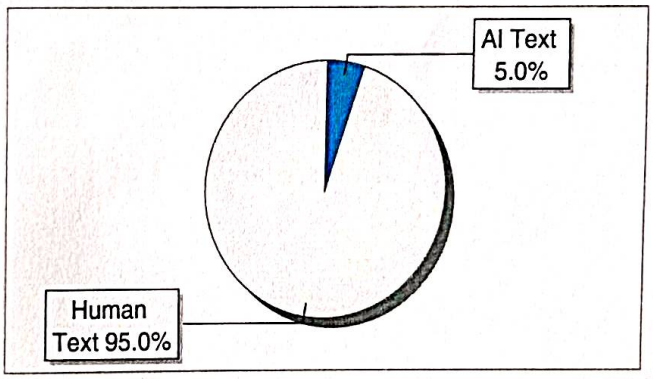

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